

REMARKS

In the Office Action, claims 10 and 40 were indicated as allowable if rewritten in independent form; claims 49-94 were withdrawn from consideration; and claims 1-9, 11-39 and 41-48 were rejected. Applicants thank the Examiner for indicating the allowability of claims 10 and 40. Claim 40 has been placed into independent form by incorporating the limitations of the base claim and intervening claims. Claim 10 also has been placed into independent form by incorporating the limitations of the base claim and intervening claims except for a portion of intervening claim 9. However, this omission is not believed to affect the allowability of amended claim 10.

By this Reply and Amendment, claims 1, 10, 22, 31 and 40 have been amended, claims 32, 33 and 49-94 have been canceled without prejudice, and claims 1-31 and 34-48 remain pending in the present application. All claim amendments are fully supported throughout the specification. No new matter has been added.

Claims 1, 6-9, 12, 13, 15-34, 36-39, 41-45, 47 and 48 were rejected under 35 USC 102(b) as anticipated by the Tubel reference, US Patent No.: 6,012,015. Applicants respectfully traverse this rejection. However, independent claims 1, 22 and 31 have been amended to clarify the claim language, and the rejection is believed not applicable.

The Tubel reference discloses downhole production well control systems able to control downhole tools based on sensed, downhole parameters. The downhole control systems collect and analyze data received from multiple discrete sensors. (See column 6, lines 18-24). A control computer 50 processes downhole sensor information. The data collected includes data from flow sensors 56, formation evaluation sensors 58, and electromechanical position sensors 59. The downhole sensors associated with flow sensors 56 and formation sensors 58 include such sensors as pressure sensors, flow sensors, temperature sensors, oil/water content sensors, geological formation sensors, gamma ray detectors and formation evaluation sensors. (See column 8, lines 21-63). Accordingly, the well control system described in the Tubel reference

relies on a plurality of discrete sensors positioned at several discrete locations to obtain desired information. However, the reference does not disclose or suggest the use of a distributed sensor system and certainly not the use of a distributed temperature sensor system to obtain data on well events.

The Tubel reference fails to disclose or suggest numerous elements of the currently pending claims. By way of example, the Tubel reference fails to disclose or suggest "using a distributed temperature sensor system to obtain temperature profile data" or "automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data" as recited in amended, independent claim 1. The reference also fails to disclose or suggest a system that comprises a "distributed temperature sensor adapted to measure temperature profile data" or a processor "programmed to identify a particular temperature signal that corresponds to a specific downhole event having an inflow of relatively cooler fluid" as recited in amended, independent claim 22. Similarly, the reference also fails to disclose or suggest "using a distributed temperature sensor system to obtain data related to temperature" or "automatically processing the data to determine a flow rate of fluid in the well" as recited in amended, independent claim 31.

Remaining dependent claims 6-9, 12, 13, 15-21, 23-30, 34, 36-39, 41-45, 47 and 48 ultimately depend from one of the independent claims discussed above. Accordingly, these claims are patentable over the cited reference for the reasons provided with respect to their corresponding independent claims as well as for the unique subject matter found in these dependent claims.

Claims 1-9, 11-17, 21-26, 28, 29, 31-39, 42 and 46-48 were rejected under 35 USC 102(e) as anticipated by the Pruett reference, US Patent No.: 6,807,324. Applicants respectfully traverse this rejection. However, independent claims 1, 22 and 31 have been amended to clarify the claim language, and the rejection is believed not applicable.

The Pruett reference discloses a method and apparatus for calibrating a distributed temperature sensing system. The system comprises a cable 105 having a distributed temperature

sensor fiber 115 and at least one calibration fiber 120. The calibration fiber is coupled to calibration sensors 125 and 130. (See column 2, lines 48-53). The calibration apparatus 110 receives data from distributed temperature sensor fiber 115 and from calibration sensors 125, 130. The data from calibration sensors 125, 130 is used to calibrate the data provided by fiber 115. The distributed temperature sensor data can be plotted on a computer display screen against the calibration sensor data for human interpretation. (See column 5, lines 19-35). Accordingly, the Pruett reference describes a method of using separate calibration sensors to calibrate readings from a distributed temperature sensor fiber.

However, the reference fails to disclose or suggest numerous elements of the pending claims. By way of example, the Pruett reference fails to disclose or suggest using a distributed temperature sensor system in "automatically determining whether fluids are flowing into or out of a tubing located in the well by processing the temperature profile data" as recited in amended, independent claim 1. The reference also fails to disclose or suggest a system that comprises a distributed temperature sensor combined with a processor "programmed to identify a particular temperature signal that corresponds to a specific downhole event having an inflow of relatively cooler fluid" as recited in amended, independent claim 22. Similarly, the reference also fails to disclose or suggest using a distributed temperature sensor system to obtain data related to temperature and "automatically processing the data to determine a flow rate of fluid in the well" as recited in amended, independent claim 31.

Remaining dependent claims 2-9, 11-17, 21, 23-26, 28, 29, 34-39, 42 and 46-48 ultimately depend from one of the independent claims discussed above. Accordingly, these claims are patentable over the Pruett reference for the reasons provided with respect to their corresponding independent claims as well as for the unique subject matter found in these dependent claims.

Claim 14 was rejected under 35 USC 103(a) as being unpatentable over the Tubel reference in view of the Anderson reference, US Patent No: 4,832,121. This rejection is respectfully traversed, however claim 14 directly depends from independent claim 1. Accordingly, claim 14 is patentable over the cited references for the reasons provided above with

respect to amended, independent claim 1. The Anderson reference does not obviate the deficiencies of disclosure with respect to the Tubel reference.

Claim 46 was rejected under 35 USC 103(a) as being unpatentable over the Tubel reference. This rejection is respectfully traversed, however claim 46 directly depends from independent claim 31. Accordingly, claim 46 is patentable over the cited reference for the reasons provided above with respect to amended, independent claim 31.

In view of the foregoing remarks, all pending claims are believed to be in condition for allowance. However, if the Examiner believes certain amendments are necessary to clarify the present claims or if the Examiner wishes to resolve other issues by way of a telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,



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